

Imaging Vertical Faulting on a WCB 3D using Duplex Wave Migration

Brian Link¹, Nawm Marmalevsky², and A. Kostyukevyck²

¹Kelman Technologies Inc., Calgary, AB, Canada; brian@kelman.com

²USIGP, Kiev, Ukrain and Tetrasis, Calgary, AB, Alberta

Abstract/Excerpt

Conventional pre-stack depth migration (PSDM) is capable of imaging vertical boundaries provided the geology has strong vertical velocity heterogeneity and the seismic is recorded with a very large surface aperture. This paper describes a Kirchhoff implementation of Duplex Wave Migration (DWM) that removes these limitations and we illustrate how DWM can provide an entirely new methodology for determining more accurate depth models. A 3D data set from the WCB will be used to illustrate the ability of DWM to image a well known normal fault, a vertical dyke that is detectable using an aeromagnetic survey but invisible on 3D seismic data and additional parallel and orthogonal vertical faulting that is invisible to both aeromagnetic surveys and 3D seismic surveys. The new knowledge about these vertical faults is used to explain unusual well results in the area and to indicate alternative sources for the hydrocarbon flow.